USER MANUAL

Longo programmable controller
LPC-2.P02V module

Version 2

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User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 230 VAC network is allowed for authorized personnel only.
DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.
WARRANTY CONDITIONS: For all modules LONGO LPC-2 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, we offer warranty for 24 months from date of sale to end buyer. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.
This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!
This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).
If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LONGO LPC-2 complies to the following standards:
- EMC:EN 61000-6-2 (EN 50082), EN 61000-6-4 (EN 50081)
- LVD: IEC 61131-2
- Vibrations and climatic-mechanical: EN 60068-2-6, EN 60068-2-27, EN 60068-2-29

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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1 ABBREVIATIONS

sorted by order of appearance in document:

SP	Set-point
CP	Control Panel
PB	Push Button
LED	Light Emitting Diode
MCU	Main Control Unit

2 DESCRIPTION

LPC-2.P02V control panel (CP) is used for room temperature regulation.

Panel is equipped with temperature and light intensity sensor and two push buttons (PB). To increase, decrease temperature set point *warmer*, *cooler* PB should be pressed respectively.

Temperature SP and panel switched off mode are represented with LED bar-graph. Light intensity sensor controls LED bar-graph intensity.

All parameters are accessible on panel's communication port. When panel is connected to the LPC-2 main control unit (MCU) parameters can be viewed and modified with LPC Manager application.

LPC-2.P02V parameters and functions allows adaptation to desired system and regulation diagram.

Panel is able to regulate 2-pipe or 4-pipe systems, depending on *4/2 pipe* parameter.

3 FEATURES

Figure 1: LPC-2.P02V module

Table 1: Features
Room temperature measurement
2 push buttons for temperature set point
10 LED bar-graph for temperature set point
Light intensity measurement
LED intensity control
Economic function
2/4 pipe heating cooling system supported
Balcony door and window function
Frost protection function
Power LED
Internal fault LED

4 OPERATION

Basic setting can be entered with panel Push Buttons (PB).
Modes of operation and parameters can be set via LPC Manager software, some of them can be also activated through special sequence PB pressing.

4.1 Operational modes

Changing operation modes
Switching between modes is done with PB1 (SP Up):
pressed 5 s - switch to *economic* mode
pressed 10s - switch to *Off* mode
Exit to normal mode is executed with a short press on a PB1 (SP Up).

Normal
This is default mode of operation of P01V module.

Economic
If set, controller will start cooling when room temperature will raise above max. temp. setpoint (SP) and stop when temperature will drop 1 °C below max. temp. SP. On the other hand, when room temperature fall's below min. temp. SP controller will start heating and stop when temperature will raise 1 °C above min. temp. SP.
In economic mode setpoint LED in barLED1 is blinking.

Off
In this mode panel sends command to switch off all devices: hot valve, cold valve, LED's. CP can be turned off using *Fan* PB or *System On/Off* command. In this case cool, heat and fan commands are switched off. Cool and heat commands are also switched off when temperature measured by the panel is inside temperature deadband values (default = 0.5 °C).

4.2 Functions

PI controller
Output variable range is 0 to 10000. Values from 0 to 4999 represents cooling and values from 5000 up to 10000 represents heating.
Example: If proportional – P parameter (default = 25) is set to 1 and difference between measured temperature and temperature set point is +1 °C, the PI output value will be 5100. On the other hand if the difference is -1 °C, the control panel regulator output value will be 4900.
If integral – I parameter (default = 5) is set to 1 and difference between measured temperature and temperature set point is +1 °C, the control panel regulator output will increase every second by 100. On the other hand if the difference is -1 °C, the control panel regulator output will decrease every second by 100.

2/4 pipe system selection
While 4-pipe (factory default) system active, controller will activate hot water actuator when heating is required and cool water actuator when cooling is required.
In case 2-pipe system is active, hot water actuator will be operated regardless whether heating or cooling is needed. Mode of operation (closing, opening) is dependent on *Winter/Summer* parameter. Example:
System selected is 2-pipe , summer mode active and SP is lower than room temperature. CP will start cooling with activating heat valve. In 2-pipe system cool valve is always inactive.

Frost protection
Function activates heat command when room temperature measured by the panel drops

below 5 °C. This function has priority over all control panel integrated functions.

Open window
Panel will operate in special mode if open window and opened balcony door are detected. This function is enabled by enabling parameters *Balcony door En.* or *Window En.* When this function is active and one of parameters *Window* or *Balcony Door* commands is active, fan will go to the first (I.) speed and valves for heating and cooling will be closed.

4.3 Parameters

If parameter is set to logical “1”, is considered to be active, enabled or set. If parameter has logical value “0” is considered to be inactive, disabled, or cleared.

Parameter can be status, command or both. When parameter is marked as status this means that module is sending information to controller. On the other hand command represents request from MCU to module.

Communication: Normal state is “1”. If cleared, there is communication error or no communication established.

Normal/Economic: When set Economic mode is enabled. Default value is “0”, therefore normal mode is selected.

Local/Remote: When “0”, Local mode is selected. In this mode CP uses setpoint set by PB. In remote mode, “1”, CP uses setpoint received from other devices (HMI, Touch Panel, OT1, ..) through communication channel.

Heat valve: When valve is opened “1” is reported, while “0” stands for closed valve

Cool valve: When valve is opened “1” is reported, while “0” stands for closed valve

System On/Off: If parameter is set to “1” CP functions are executing in normal mode. If set to “0” Fan speed and all valves are OFF (closed).

Winter/Summer: Used only for t*wo-pipe system* to change calculation for Hot valve and Fan speed; Winter – heating (“0”) to Summer – cooling (“1”)

4/2 pipe: Four-pipe system manages hot and cold water pipes simultaneously. Two-pipe system manages only one pair of pipes (one valve, pump). Operation in two-pipe system is therefore dependent on *Change-over* parameter.
“0” = Four pipe system
“1” = Two pipe system

Balcony door En.: When switch for detecting opened balcony door is connected to the system, this function should be enabled (“1”).

Balcony door switch: Parameter reports whether door are closed or opened
“0”: closed
“1”: opened

Window En.: When switch for detecting opened window is connected to the system, this function should be enabled (“1”).

Window: Parameter reports whether window is closed or opened
“0”: closed
“1”: opened

Max. temp.: denotes max. SP temp. which is scaled to top of barLED1

Min. temp.: denotes min. SP temp. which is scaled to bottom of barLED1

P regulation par.: Proportional parameter for PI calculation algorithm on CP

I regulation par.: Integral parameter for PI calculation algorithm on CP

PI Deadband: Value of change for PI loop output.

Temp. SP: This value is taken into PI calculation algorithm

Room temp.: Room temperature measured by CP panel

Absolute PI out: Result of PI calculation algorithm used for fan speed and valve opening

Light intensity: Actual light intensity measured by sensor on CP

Min. light intensity: When *Light intensity* is lower than this parameter, LED bargraph on CP turns off

Remote temp. SP: When *Local/Remote* parameter is active this parameter is taken into PI calculation algorithm as SP.

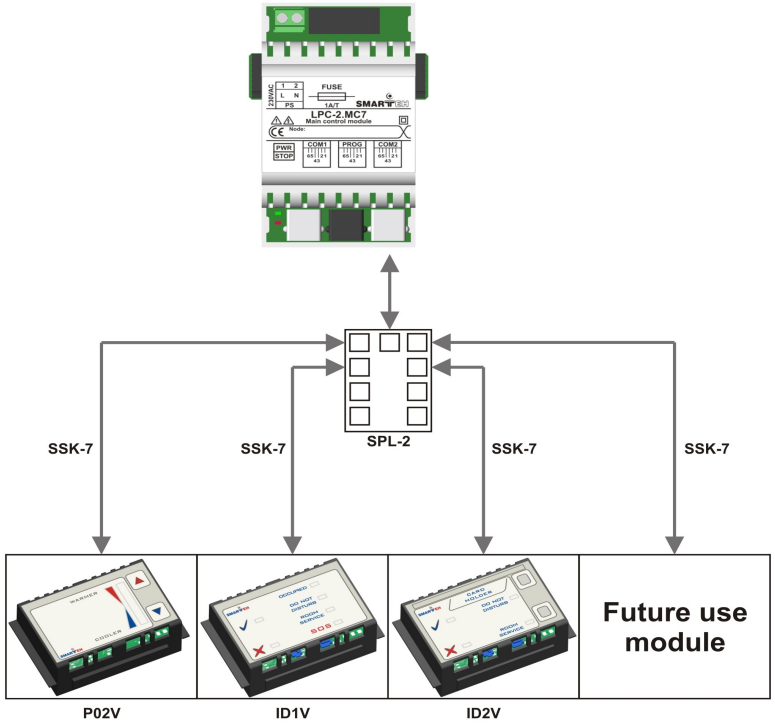
SP up: When *Local/Remote* parameter is active and this command changes to active, CP will increment SP for 1/10 of scale. It acts like one press on *Up* PB1 on CP.

SP down: When *Local/Remote* parameter is active and this command changes to active, CP will decrement SP for 1/10 of SP range. It acts like one press on *Down* PB2 on CP.

5 INSTALLATION

5.1 Connection scheme

Figure 2: Connection scheme



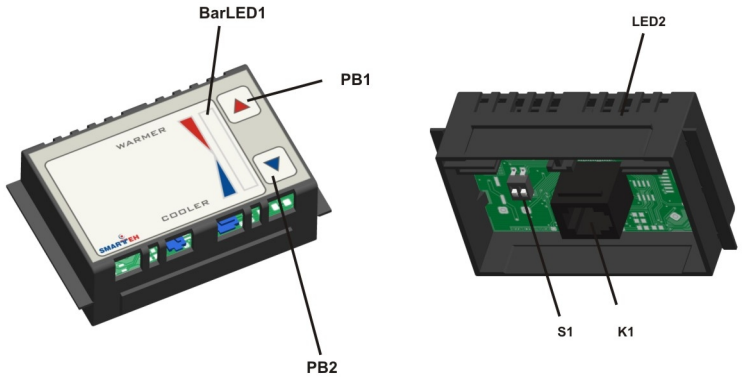


Table 2: K1		
K1.1	GND	Ground
K1.2	7- 30 VDC	Power supply input
K1.3	Standard RS485 A	Data receive/send line A
K1.4	Standard RS485 B	Data receive/send line B

Table 3: LEDs & Buttons		
LED2	color: red	On: RS485 communication fault Off: RS485 communication OK
BarLED1	Temp. SP	lit LED presents actual set point relative to range *Min. temp.* (bottom barLED) - *Max. temp.* (top barLED)
PB1	SP up	Increase by one step, step = (*Max. temp* - *Min. temp*) * 1/10
PB2	SP down	Decrease by one step, step = (*Max. temp* - *Min. temp*) * 1/10

Table 4: S1		
RS485 ADDRESS	**Switch 1**	**Switch 2**
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

Module connects to the MCU unit on its RS485 port using interconnection cable (e.g., SSK-7). When more special modules (e.g. LPC-2.ID1V, LPC-2.ID2V, LPC-2.P01V) are connected to MCU, splitter is also required (e.g. SPL-2). Interconnection cable can ordered from Smarteh or terminated on site, considering wiring scheme bellow:

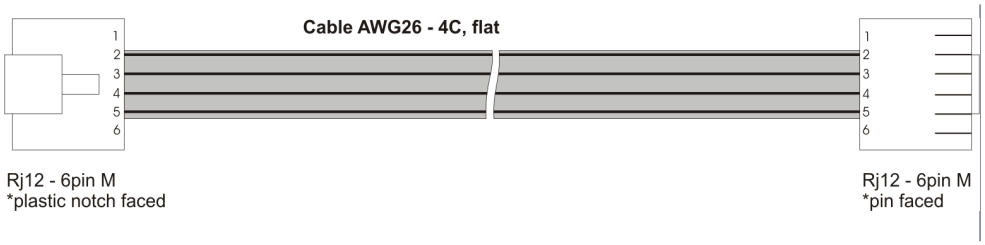


Figure 1: Interconnection cable SSK

5.2 Mounting frame selection

Frame, suitable for P02V module insertion, should be modular one at least 3 gang wide. Be careful to have corresponding flush-mounting box provided on the place where module will be positioned.

Smarteh has verified following lines to be compatible with LPC-2.P02V module:

- Bticino – Living, Light
- Gewiss – Playbus, System
- Vimar – Plana, Idea
- Tem
- Master

Frames of other vendors most probably suits as well, but they were not verified by Smarteh. Before installation verify compatibility of non listed frames.

Module housing has a fin on each side, which can be easily removed with knife cutter or pliers. This adaptation enables housing to be build in various frame formats. With regard to frame used you may remove fin for housing to fit in.

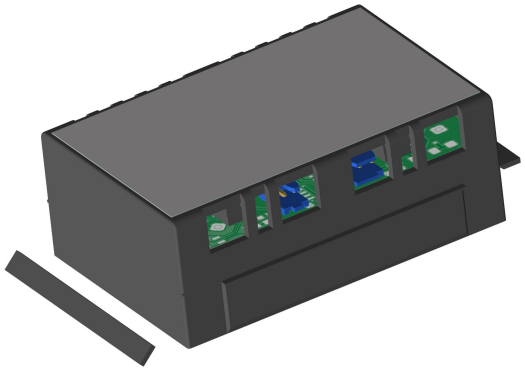
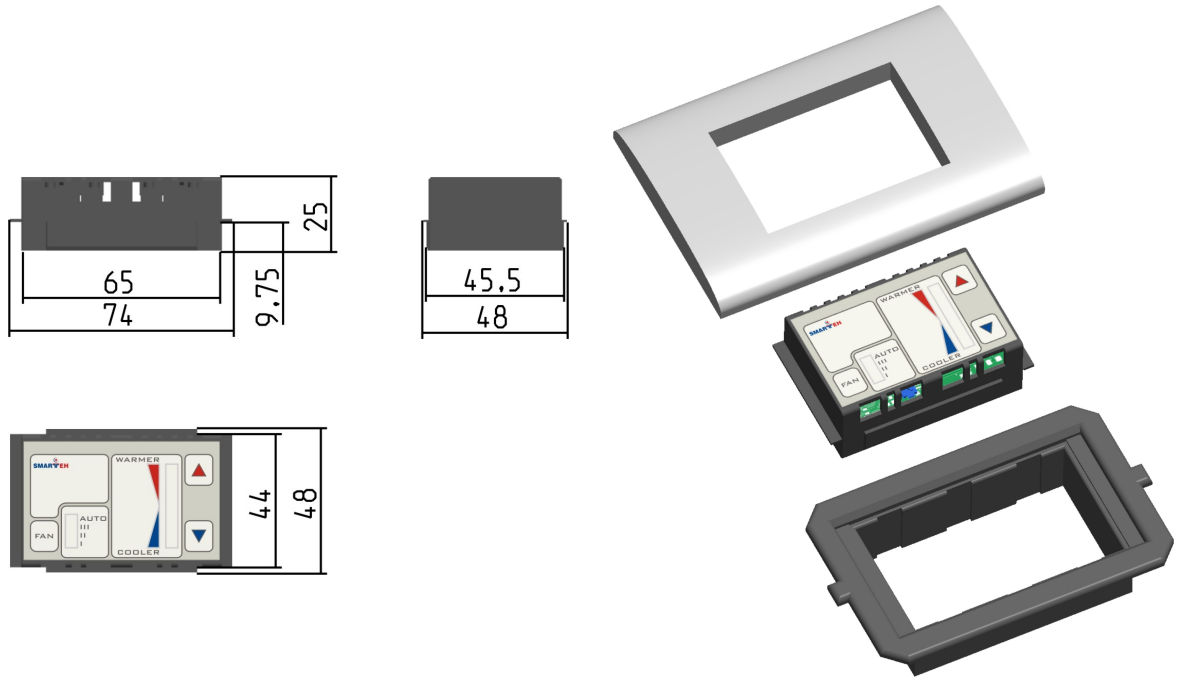


Figure 2: Fin removing

5.3 Mounting instructions

Figure 3: Housing dimensions



- Dimensions in millimeters.

All connections, module attachments and assembling must be done while module is not connected to the main power supply.

Module should be positioned in the wall inside of the room. Avoid direct sunlight or positioning near heating/cooling source object.

1. Set the correct RS485 address (S1 switch) for LPC-2.P02V (refer to the Table 4).
2. Connect interconnection cable to the connector K1. Max. allowed tractive force is 30 N.
3. Put the LPC-2.P02V in mounting frames
4. Cover LPC-2.P02V with cover plate

LPC-2.P02V is connected to the main control unit with interconnection cable (e.g., SSK-7) which must be ordered together with LPC-2.P02V module. When more modules (e.g., LPC-2.ID1V, LPC-2.ID2V, LPC-2.P02V or up to four LPC-2.P02V) are connected to main control unit, splitter (e.g., SPL-2) is also required (Figure 2).

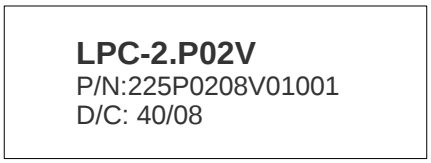
Module address on RS485 network is set with DIP switch on the back the module (Table 4).

NOTE: Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.

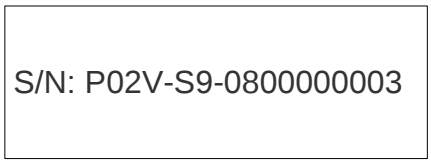
5.4 Module labeling

Figure 5: Labels

Label 1:



Label 2:



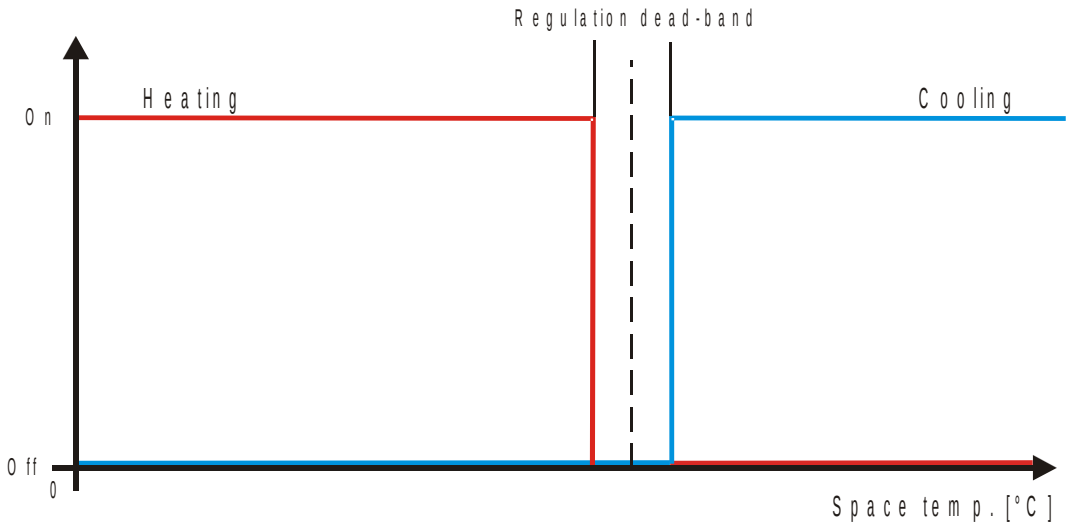
Label 1 description:

- **LPC-2.P02V** is the full product name
- P/N: 225P0208V01001 is the part number
  - 225 – general code for LPC-2 product family,
  - P02 – short product name,
  - 08 – year of code opening
  - V - denotes flush frame mounting module
  - 01 – derivation code
  - 001 – version code (reserved for future HW and/or SW firmware upgrades).
- D/C: 40/08 is the date code.
  - 40 – week and
  - 08 – year of production

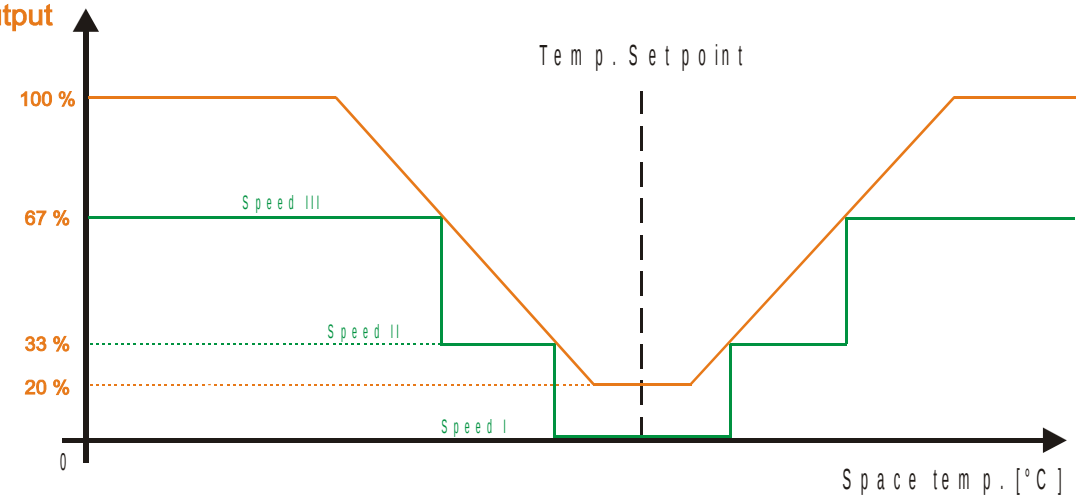
Label 2 description:

- S/N: P02V-S9-0800000003 is the serial number.
  - P02V – short product name,
  - S9 – user code (test procedure, e.g. Smarteh person xxx),
  - 08 – year (last two cyphers)
  - 00000003 – current stack number; previous module would have the stack number 00000002 and the next one 00000004.

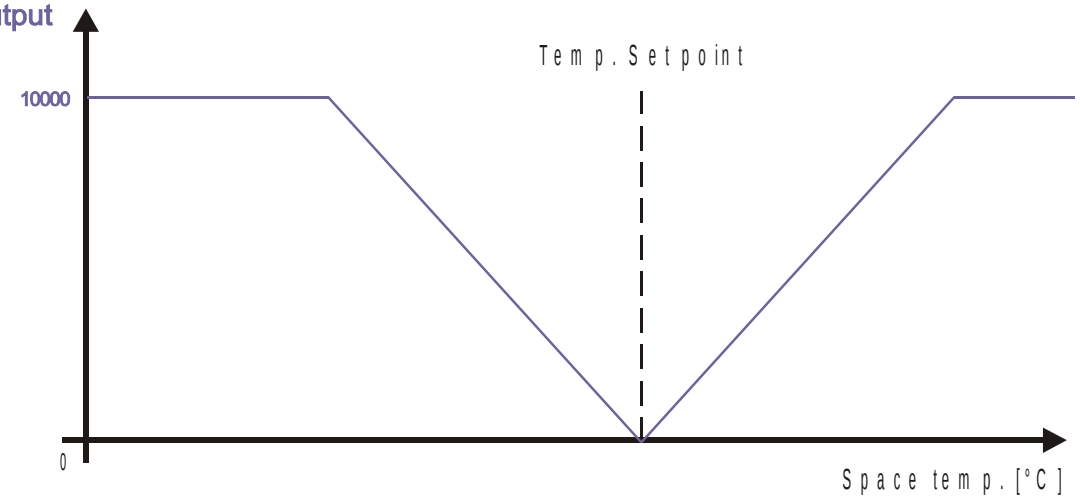
6 REGULATION DIAGRAM



Fan reference output



PI regulator output



7 TECHNICAL SPECIFICATIONS

Table 5: Technical specifications	
Power supply	from MCU
Interconnection connector type	RJ12 6/6
Power consumption	0.5 W
Dimensions (W x H x D)	65 x 47 x 25 mm
Weight	35 g
Maximum altitude	2000 m
Mounting position	all directions
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Transport and storage temperature	-20 to 60 °C
Protection class	IP 20

8 CHANGES

The following table describes all the changes to the document.

Date	V.	Description
1.7.2012	002	CGP General update.
28.2.2009	001	The initial version, issued as *LPC-2.P02V module UserManual*.

9 NOTES